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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,653	03/29/2004	Charles M. Lieber	H0498.70112US01	3416

7590 11/19/2004  
Timothy J. Oyer, Ph.D.  
Wolf, Greenfield & Sacks, P.C.  
600 Atlantic Avenue  
Boston, MA 02210

EXAMINER


WEISS, HOWARD

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 11/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Office Action Summary</b></p>	<p>Application No.</p> <p align="center">10/812,653</p>	<p>Applicant(s)</p> <p align="center">LIEBER ET AL.</p>	
	<p>Examiner</p> <p align="center">Howard Weiss</p>	<p>Art Unit</p> <p align="center">2814</p>	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 November 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3,5,7-10,13,14,20-54,56-62 and 90-113 ~~is/are~~ are pending in the application.
- 4a) Of the above claim(s) 24-54 and 60-62 ~~is/are~~ are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,5,7-10,13,14,20-23,56-59 and 90-113 ~~is/are~~ are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1,3,5,7-10,13,14,20-54,56-62 and 90-113 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| <p>1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)</p> <p>2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)</p> <p>3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br/> Paper No(s)/Mail Date <u>1104</u>.</p> | <p>4) <input type="checkbox"/> Interview Summary (PTO-413)<br/> Paper No(s)/Mail Date. _____</p> <p>5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)</p> <p>6) <input type="checkbox"/> Other: _____</p> |
|--|---|

Attorney's Docket Number: H0498.70112US01

Filing Date: 3/29/04

Continuing Data: Continuation of 10/033,369 (10/24/01 now U.S. Patent No. 6,781,166)  
which is a Continuation of PCT/US00/18138 (6/30/00) and claims  
benefit of 60/142,216 (7/2/99)

Claimed Foreign Priority Date: none

Applicant(s): Lieber et al. (Rueckes, Joselevich, Kim)

Examiner: Howard Weiss

***Election/Restrictions***

1. Applicant's election of Group I, Claims 1, 3, 5, 7 to 10, 13, 14, 16 to 18, 20 to 23 and 56 to 59, is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (M.P.E.P. § 818.03(a)).
2. Claims 24 to 54 and 60 to 62 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant is requested to cancel the non-elected claims as part of a complete response to this office action. Cancellation of the non-elected claims would not preclude the later filing of a divisional application on the non-elected invention (please see 35 USC 120 and 121).

***Specification***

3. The disclosure is objected to because of the following informalities: In Line 1 of the Specification as amended, ---now U.S. Patent No. 6,781,166--- should be inserted after "10/24/01." Appropriate correction is required.
4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

***Claim Objections***

5. Claim 3 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 3 depends upon canceled Claim 2.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 56, 57 and 59 are rejected under 35 U.S.C. 102(b) as being anticipated by Popovic et al. (U.S. Patent No. 4,979,149).

Popovic et al. show all aspects of the instant invention (e.g. Figures 1 and 4) including an electrical crossbar array comprising two crossed wires **2,9** defining a memory element **1** switchable between two readable states **3,4** and auxiliary circuitry having transistors **14,15** and capacitors **31,32**.

8. Claims 1, 5, 7 to 10, 13, 14, 16 to 18, 20 to 23, 56 to 59, 90 to 93, 96 to 102 and 113 are rejected under 35 U.S.C. 102(e) as being anticipated by Kuekes et al. (U.S. Patent No. 6,256,767).

Kuekes et al. show all aspects of the instant invention (e.g. Figures 1, 3 and 8) including:

- an electrical crossbar array **30** on a substrate
- first **14** and second **12** nanoscopic wires in first and second sets, respectively, positioned as claimed and not in electrical contact with each other but in contact with contact electrodes **36**
- auxiliary circuitry **38,40** including transistors, capacitors and contact electrodes

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 3, 94, 95 and 102 to 112 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuekes et al. and Brandes et al. (U.S. Patent No. 6,445,006).

Kuekes et al. show most aspects of the instant invention (Paragraph 8) except for the wires in electrical or Van der Waals contact and made of single or multiwall carbon nanotubes. Brandes et al. teach (e.g. Figure 9 and Column 2 Lines 31 to 40)

to have wires **678, 679** in electrical or Van der Waals contact and made of single or multiwall carbon nanotubes to capitalize on the semiconducting properties of carbon nanotubes (Column 8 lines 1 and 2). It would have been obvious to a person of ordinary skill in the art at the time of invention to have wires in electrical or Van der Waals contact and made of single or multiwall carbon nanotubes as taught by Brandes et al. in the device of Kuekes et al. to capitalize on the semiconducting properties of carbon nanotubes.

### ***Double Patenting***

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 1, 3, 5, 7 to 10, 13, 14, 16 to 18 and 20 to 23 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1, 2, 6 and 8 to 30 of U.S. Patent No. 6,781,166. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim an electrical crossbar array with at least two crossed wires one of which being nanoscopic (i.e. nanowires, nanotubes, etc.) said crossed wires either in contact with each other (i.e. electrical contact being a form of contact) or in Van der Waals contact and arranged as claimed (e.g. parallel arrangement).

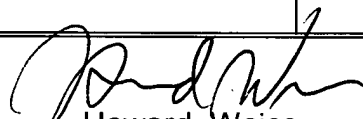
***Conclusion***

13. Paper copies of cited U.S. patents and U.S. patent application publications will cease to be mailed to applicants with Office actions as of June 2004. Paper copies of foreign patents and non-patent literature will continue to be included with office actions. These cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site ([www.uspto.gov](http://www.uspto.gov)), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy. Requests to restart a period for response due to a missing U.S. patent or patent application publications will not be granted.
14. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(703) 872-9306**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.
15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Howard Weiss at **(571) 272-1720** and between the hours of 7:00 AM to 3:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via **Howard.Weiss@uspto.gov**.

16. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/211; 365/151	11/16/04
Other Documentation: PLUS Analysis Report	11/5/04
Electronic Database(s): EAST, IEL	11/16/04

HW/hw  
16 November 2004

  
Howard Weiss  
Examiner  
Art Unit 2814